

Chapter 5

A Different Vision of Ancient Settlement Dynamics: Creation and Application of a Model of Evolution of Roman Settlement of the Plateau Lorrain (France)



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Abstract Research concerning settlement dynamics is mainly based on data from archaeological field survey. This method of investigation provides researchers with a lot of information that can help to identify trends and to model the evolution of settlement structure at different scales. Nonetheless, field survey data is sometimes incomplete and only shows a snapshot of the settlements. This static information lacks a certain number of parameters (evolution of architectural, economic, social features, etc.) which are essential to perceive the inherent evolution of the settlements and therefore to visualize their own evolution within the dynamics of settlement trajectory networks. On the other hand, data from archaeological excavations enable us to detect those phenomena. This paper aims to propose a methodological approach to try to resolve this lack of parameters: the creation of an evolutionary model of the settlements from the information collected during excavations. Applied to the sites discovered by field survey, and combined with other analytical tools, the model allows for a better understanding of the diversification phenomena and the processes of spatial development of the settlement pattern. This method, which offers solutions to enhance the static information provided by survey data, was designed for the study of Roman settlement of the Plateau Lorrain (France), but it can be applied to other periods and to other regions as well.

Keywords Field survey · Temporal dimension · Archaeological excavation · Modelling · Settlement study

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5.1 Introduction¹

Archaeological field survey allows archaeologists to discover structures and artefacts of all kinds betraying the presence of settlement or other ancient human activity at the surface. It is then possible, after study, to gather information on the function, the spatial organization and the chronology of the archaeological sites investigated. If the survey is carried out in a systematic and spatially continuous way, archaeologists can visualize the number of settlements, their function, their size and their dating throughout a territory, in order to perceive the organization and the settlement dynamics of an area at a given moment or over the long term (see for a few examples of this type of studies in Roman Gaul: Favory et al. 1987–1988; Durand-Dastès et al. 1998; Trément 1999; Van der Leeuw et al. 2003; Gandini 2008).

Beside the fact that survey data quality is highly conditioned by post-depositional processes (erosion, overlap, soil acidity, etc.) or the uneven exposure of artefacts linked to tillage conditions that can alter their distribution on the surface and thus bias the perception of a settlement (see Alcock and Cherry 2004; Dabas et al. 2006), they can also present a major problem due to the nature of this method of investigation. The observation of structures and collection of surface artefacts does not always allow us to understand the internal history of the settlements, which could sometimes present several phases of evolution. This has implications for the visualization and the understanding of ancient settlements. As we shall see, part of the research questions then cannot be addressed and problems can arise in spatial analysis.

Therefore, this contribution proposes solutions to qualify and improve the study of settlement systems based on archaeological field survey data. To this end, information from archaeological excavations—which reveals the intrinsic history of settlements—was used. The investigation of the Roman settlement system of the Plateau Lorrain (France) provides keys to improve and evaluate analyses based on results from archaeological field survey.

5.2 The Temporal Dimension of Data from Archaeological Field Surveys

In order to understand the origin and the nature of the problem posed by these data, let us first consider the specific signal given by the results of archaeological field surveys.

¹A French version of this chapter was published in 2016 (Nüsslein 2016b). Some adjustments have been made following the suggestions of the reviewers of this chapter.

5.2.1 *Results of Archaeological Field Surveys: A Linear Signal*

While archaeological field survey offers many advantages, such as the possibility of exploring large areas and listing numerous deposits while gathering a large amount of data, this method presents a major problem. Prospecting only allows for the collection of the artefacts found on the ground. The building materials and objects stemming from different phases of the explored settlement are thus mixed. Stratigraphic information, provided only by excavations, which allows for the reconstruction of the evolution of a settlement, is absent. The remains collected during archaeological field survey give information on the building materials used, the artefacts present and the surface area, but they are compressed into a flattened assemblage detached from the chronological evolution, and thus from the different phases of the settlement.

In many cases, especially because of lack of artefacts, limited study of artefacts and/or poor preservation of sites, data from archaeological field surveys only offer three chronological elements: date of appearance, date of disappearance and duration of existence (Durand-Dastès et al. 1998). Therefore, this method of investigation will often only provide a summary and a fixed image of the settlement. Consequently, since these data do not give a true temporal dimension, the results of archaeological field survey produce a linear signal (Fig. 5.1). Without excavations or detailed artefact study from field survey, it is not possible to trace the different stages of the history of a settlement: creation, expansion, peak, various functions over time, architectural evolution, decline, abandonment, etc. From an ontological point of view, an excavated settlement and a prospected site could also be regarded as different entities referring to their own concepts (Favory et al. 2012). Grenon and Smith (2004) proposed to distinguish, on one hand, ‘Snap’ entities, which have a chronological depth and which exist at each time step, and ‘Span’ entities which constitute events and processes that require a temporal extent. These two entities are entwined: a Roman *villa*, for example, is a ‘Snap’ entity, but its evolutionary process, measurable by its increase in size or changes in architectural and decorative features, is a ‘Span’ entity. Similarly, a settlement that is known only from archaeological field survey and whose date of establishment and abandonment are known along with its main characteristics could be considered as a ‘Snap’ entity, but an excavated settlement, for which evolutionary mechanisms are known may be perceived as a ‘Span’ entity.

5.2.2 *Consequences for the Study of Settlement Patterns*

In some cases, the temporal information from survey data can be best exploited by extensive field analyses or advanced artefact studies (e.g. Trément 2000; Moreau et al. 2011; Tol 2012). Sometimes, even the temporal evolution of the surface of a settlement may be reconstructed. For example, on the site of Dachstein (Bruche

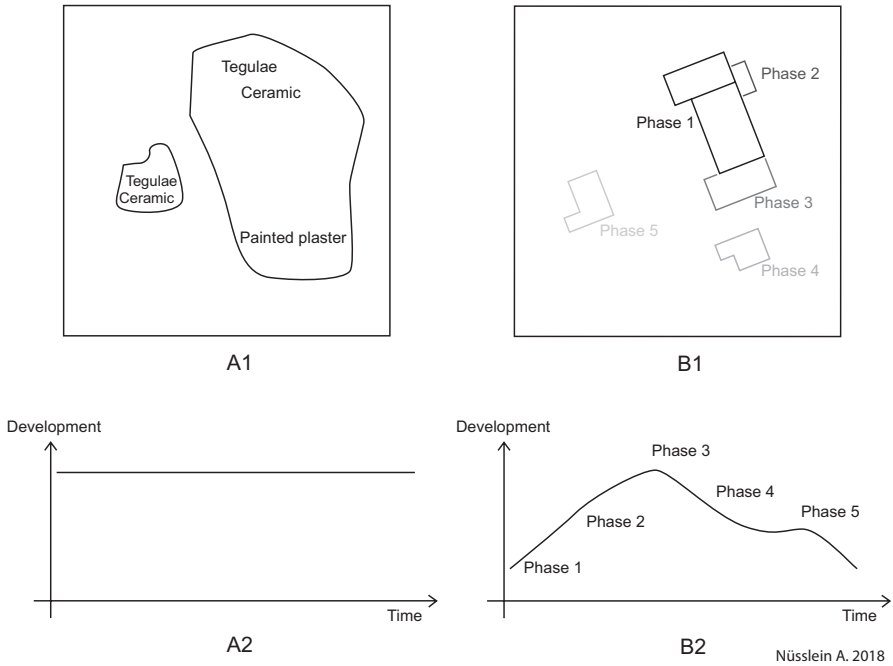


Fig. 5.1 The difference in information content between archaeological field survey and excavation. The same settlement was discovered in an archaeological field survey (A1) and in an excavation (B1). After analysis of the artefacts, this settlement did not show the same evolution configuration depending on the mode of investigation employed. The survey data revealed a linear development (A2) located at its ‘optimal’ level throughout its existence, while the excavation data showed a complex evolution of the settlement with phases of enlargement or decline (B2)

Valley, Alsace, France) it was possible, thanks to the study of ceramics, to determine the spatial and economic evolution of the settlement (Baudoux 2012). However, the realization of this type of study is often complicated, time-consuming and cannot be applied over large regions. So, there is information missing for many sites in most study regions. This has consequences for the study of settlement patterns in two respects.

First, as was already pointed out, at the level of the temporal dynamics of the settlement system, it is often impossible to retrace the history of a settlement and to relate its various characteristics to a specific phase of its existence in order to follow its architectural, economic and social evolution. Without knowing what is going on at the level of the settlements during their different phases of evolution, the understanding of the evolution of a number of settlements is not complete.

Secondly, at the level of spatiotemporal dynamics of a (regional) settlement system, it is necessary to characterize the sites present in the study area and to classify them in relation to each other, period by period, in order to analyse their organization and evolution. For this, the ideal is to have information on the characteristics of each phase for all settlements. The ideal situation is therefore to have data that form

a three-dimensional cube, such as Berry's 'geographical information matrix' (Berry 1964; Favory et al. 2012), where settlements, their attributes and time intersect. However, this ideal configuration can only be provided by excavation information or very advanced artefact studies. Without this, archaeologists are therefore often obliged to work on a 'snap' summary of the settlements' characteristics.

To illustrate this point, let us take the example of a site discovered in archaeological field survey, occupied from the first to the fourth century CE. When creating the typology, a status (small farm, *villa*, etc.) is typically assigned according to its general characteristics. The settlement will thus be assigned the same status over the whole of its existence, whereas in reality it did not necessarily hold the same status from its creation to its abandonment. The typological classification carried out on settlements discovered in archaeological field survey here finds its limit (Gandini 2008). Subsequently, during spatiotemporal analysis, if the study is done on a fine timescale—per century, for example—this phenomenon can cause errors in the modelling of settlement networks. For example, a site with a hierarchically high status will appear in the first century CE as an important pole compared to its neighbours, when in reality it may not have had this importance in the structure of the settlement network at that time. However, researchers have tried to address these problems:

- By formulating the hypothesis that the data collected on an settlement constitute a description of the 'optimal' state of the site (Durand-Dastès et al. 1998).
- By working quantitatively on the evolution of the number of settlements and their area over time (Durand-Dastès et al. 1998).
- By treating temporal data as descriptors in the formation of typologies (date of creation, duration of occupation, previous occupation, etc.) as much as the variables materials, surface area, artefacts, etc. This is to create interrelationships between the different characteristics of settlements and in particular to improve the characterization of occupation phases (Durand-Dastès et al. 1998; Favory et al. 2012).
- By analysing sets of settlements existing in the same periods in order to characterize each epoch (Durand-Dastès et al. 1998).
- By making comparisons and associations between the typological classes of settlements discovered in archaeological field surveys and the excavated settlements (Van der Leeuw et al. 2003).
- By modifying the character of the 'duration of occupation' descriptor when classifying settlements by period. Thus, it is not the duration of the whole occupation which is taken into account in the calculation, but the duration of existence of a settlement at the end of each century. However, this approach was not conclusive and did not allow the researchers to obtain the desired results (ARCHAEDYN 2013).

Although these studies managed to adapt, with varying degrees of success, to the limitations of survey data, important elements were still missing for a good understanding of the dynamics and spatiotemporal organization of settlement systems. To

reduce these problems and to refine analyses carried out on ancient settlement patterns, it is here proposed to make a wider use of the results of excavations.

5.3 Survey Data Versus Excavation: How to Improve the Understanding of the Ancient Settlement System of the Plateau Lorrain

In some studies dealing with the evolution of ancient societies based on field survey data, the settlement system dynamics can only be studied quantitatively. The nature of the archaeological data limits the visualization of temporal dynamics to displaying the evolution of the number of settlements and a series of quantitative observations (rate of increase, rate of decline, number of creations, abandonments, etc.).

From excavation data, a different approach can be proposed to analyse the characteristics of the settlements and, by extension, to study their temporal evolution. This is possible by studying the dynamics, not in a quantitative way, but in a qualitative way by looking at the internal settlement trajectory. This approach is used to achieve two objectives.

First, the aim is to study the internal dynamics of the settlements in order to weigh the quantitative evolution curves of the settlement system and to perceive the evolution of the hierarchical relations (in a large and functional sense) that the settlements maintain with each other over time (Nuninger and Favory 2011). The second objective is to create a model for the evolution of settlements. This model, established over several stages, allows us to provide solutions to problems induced by survey data and thus to improve our analysis of temporal and spatial dynamics.

5.3.1 The Roman Settlement System in Two Micro-Regions of the Plateau Lorrain

The proposed approaches were used in the study of the Roman settlement system of two micro-regions located on the Plateau Lorrain (Grand-Est region, France): Alsace Bossue (zone 1), and the sector located between the Seille river and the Nied river (zone 2). These two micro-regions are situated in a hilly landscape formed by a limestone substratum. These areas are very well known by archaeological field surveys. Indeed, the ancient occupation of these areas is widely recognized thanks to the many campaigns carried out since the 1980s (to mention only the main ones, see Laffite 1998; Thomann and Nüsslein 2000, 2001). As a result, several syntheses deal with the evolution of the settlement pattern in the Roman period in these micro-regions (Laffite 2004; Nüsslein 2016a; Nüsslein 2018). Nevertheless, the sites have not been the object of advanced artefact studies that would have made it possible to follow their chronological evolution in the details.

A typology of settlements at the time of their apogee was made according to various criteria and from statistical methods (for more details see Nüsslein 2016a; Nüsslein et al. [in press](#)). This classification is composed of six types of settlements. The agglomerations (small towns) are at the top of the hierarchy. They are very big settlements that host artisanal activities and have a long life span (class A). The very large *villae* correspond to the second level of the typology (class B). They are built in stone with mortar and display a very high level of wealth and comfort. The medium-sized *villae* (class C) are just below. They are smaller than the large *villae* but are richly ornamented. Small *villae* are even smaller and sometimes consist of buildings built of perishable materials (class D). Finally, farms and small farms are small settlements, formed by one to three buildings, which are not very rich and have a relatively short lifetime (classes E and F).

From this classification, based essentially on survey data, the dynamics of the settlement system in these sectors, which were almost similar, had been studied. During the first century CE, the first Roman settlements are gradually implanted on occupations from the La Tène period: they constituted the basis of the ancient settlement system. In addition to this phenomenon, new settlements were created. During the second century, the settlement network was completed by the small and medium-sized settlements which increase the number of sites. The settlement pattern extends. During the High Empire, poles of attraction structured the network of settlements by organizing and attracting sites on their periphery. Around these centres (road nodes and agglomerations), small local networks expanded. Large and medium-sized *villae* were at the head of these networks, around which the other smaller settlements were set up. Throughout the High Empire, the space was strongly polarized and hierarchized and the settlement system extended over all available space at the time of its peak. During Late Antiquity, the organization of the settlement network gradually changed: the number of sites decreases, the system refocused on the large settlements of the High Empire and lower status sites disappeared. At the end of the fourth century and at the beginning of the fifth century, the last traces of known Roman settlements disappeared.

5.3.2 Methodology

5.3.2.1 Choice of Data: Conditions and Modalities

The first step is to select and compile the excavation data that we possess.² This information can be unequal and it is necessary to only select reliable data: archaeological materials studied after excavation (to understand the evolution and phasing of the site), well-preserved settlements (to avoid any taphonomic bias) and size of site properly explored (in order to have the most complete information possible).

²For references to the excavation reports used, see Nüsslein (2016a).

Although data for the sector between Seille and Nied (zone 2) was sufficient, few excavated settlements were known for the sector Alsace Bossue (zone 1).

In order to overcome this problem, we selected sites outside the micro-region. For example, settlements within a radius of less than 20 km around the study area were chosen. The choice to use external data can of course be debatable. However, the selected settlements were located near the study area, in a similar geographical (same landscape unit) and historical (the territory of the Mediomatrices tribe) context. The settlements selected, 22 in total, represent, at their peak, relatively equally, all the classes of settlements of our typology (Fig. 5.2).

5.3.2.2 From the Settlement Trajectory

Once the excavated sites are chosen, their trajectory is visualized and analysed. This provides information on the complexity of the evolution of settlement while placing these dynamics in a larger context. By extension, the goal is to lay the foundation

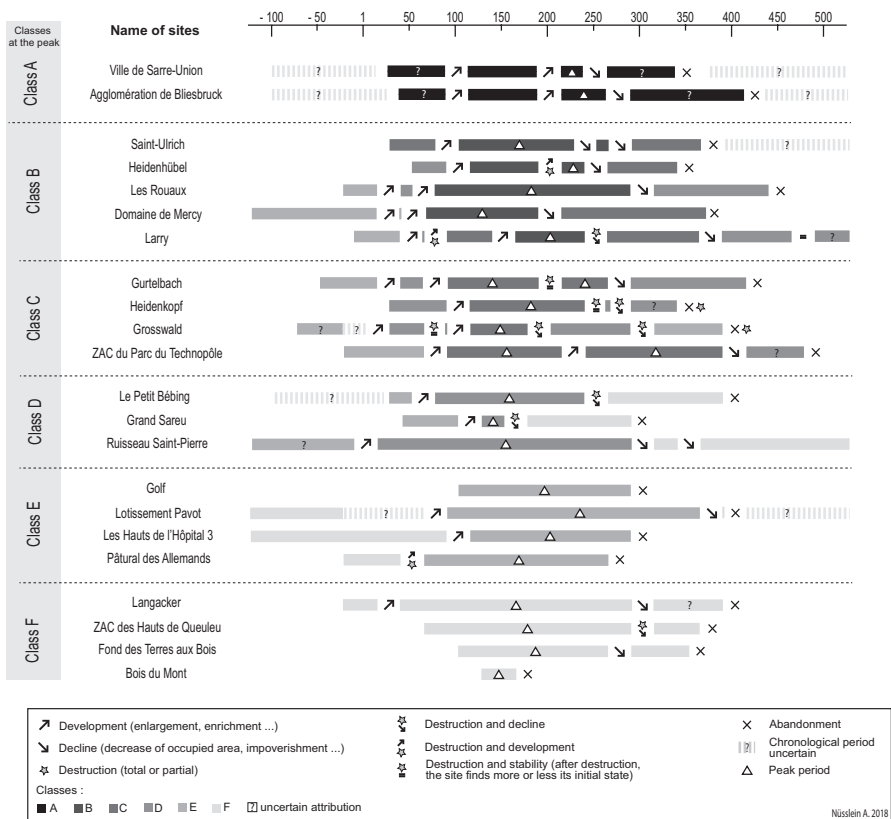


Fig. 5.2 Matrix of the typological trajectories of settlements

for a development analysis to perceive and understand how and why settlements evolve in one way or another. We want to understand how a site moves from one status to another and when. In this context, we relied on their morphological evolution and on their hierarchical trajectory, in other words on their evolution within the different classes of our typology over time. To carry out this study, it is first necessary to compare the criteria of each class of our typology with those of the phases of the excavated settlements. Thus, one of the categories of the typology is assigned to each period of the selected sites according to their characteristics. For example, if during its second phase of evolution, that began around the year 75 and ended around the year 125, a settlement displayed the characteristics of the class D profile, this status was attributed during this period. Note, however, that for its peak phase, a settlement has the status assigned to it during the creation of the typology since the characteristics of the site during this period were used for its ranking.

The results make it possible to create a matrix in which the typological trajectory of each settlement was placed on the same timescale (Fig. 5.2). The 'story' of each settlement is represented by a line whose length represents its lifetime, punctuated by events (development, decline, destruction, etc.) that marked the beginning and the end of the different internal states for which a typological class was assigned. Settlements were ordered according to their class at the time of their peak (the class assigned when creating the typology). We can observe that the development is reflected by an extension of the occupied area or by an enrichment illustrated by new elements of comfort and decor (hypocaust, bath, painted plaster, etc.). On the other hand, a decline is characterized by a smaller occupied area and/or an impoverishment. Finally, the peak phase corresponds to the moment where the site displays its largest size and highest degree of wealth, and its highest hierarchical status.

5.3.2.3 ... to the Creation of a Model of Evolution

As we have seen, the traditional typological approach reduces the reality of settlements discovered in archaeological field surveys to a single function throughout their existence. The matrix shows that in each of their phases, sites have a different status. Moreover, within each class, virtually all settlements follow the same typological trajectory. It is then possible to create a hierarchical evolution model for each class of our typology. Thus, in order to break this fixed vision of the prospected sites and to improve our vision of the temporal and spatial evolution of the settlement system, an evolution model that allows to follow the typological evolution of each type of site was created and applied to the sites discovered in pedestrian surveys.

To establish the model, we chose a 100-year time step, despite the good chronological resolution of the excavation data (Fig. 5.3). This is for reasons of convenience related to its development and its application to field surveyed settlements that are often poorly dated. Thus, from the information contained in the evolution matrix (Fig. 5.2), we assigned for each century a class to each of the groups. The

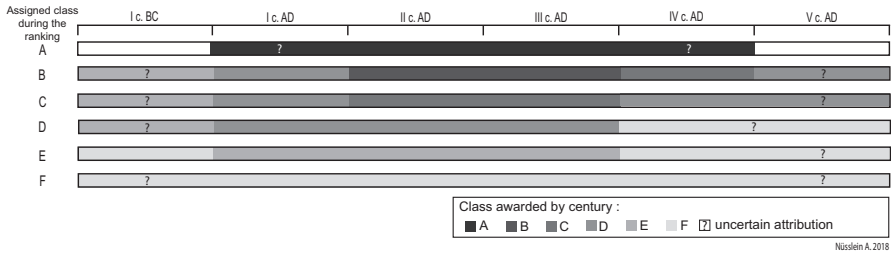


Fig. 5.3 Model of evolution of settlements

attribution was made according to the similarity of the status of the settlements within the century in question. Some attributions are uncertain, particularly at the end of the period studied, because of the presence of too few sites.

Despite this pitfall, it was possible to progressively build a model that corresponds to a functional evolution reference system for almost all types of settlements (Fig. 5.3). Thus, for each of the classes treated, the typological trajectory could be followed of the settlements classified in this group during the creation of the typology. For example, we can see that the settlements classified during the realization of the typology in class C corresponded to class E during the first century BCE, to settlements from Class D during the first century CE, to settlements of Class C throughout the second and third centuries and finally to class D settlements throughout the fourth and fifth centuries.

5.4 Results

5.4.1 Composition and Evolution of the Settlement System

Using the matrix, many observations on the temporal evolution rate and the typological settlement trajectory can be established (Fig. 5.2). Let’s quickly review the main ones. First, it was clear that all settlements followed, sometimes long, processes leading them, in a first instance, to their peak and, in a second instance, to their disappearance: indeed, except for class F settlements, no site had its highest status at the time of its creation and no sudden disappearance was observed directly after a peak phase. Settlements follow the same evolution curve, which is divided into three major periods, but the rate of change may be different depending on the site. The development phase at the beginning of the first millennium was sudden and took place in less than a century, while the period of decline and abandonment during Late Antiquity took over two centuries. Between these two periods, from 100 to 250 CE, the peak phase was shared by all settlements. Within these periods of evolution, a settlement could grow faster or more slowly than the whole system. Sites, similar in status at the beginning of the Roman period, thus took different development trajectories. For example, very large *villae* had the same status as

medium-sized *villae* at the beginning of the Roman period. Similarly, during Late Antiquity, some settlements were declining faster than others.

Meanwhile, other results were produced by comparing this matrix with the quantitative evolution of the settlement pattern from field survey data (sites dated to the

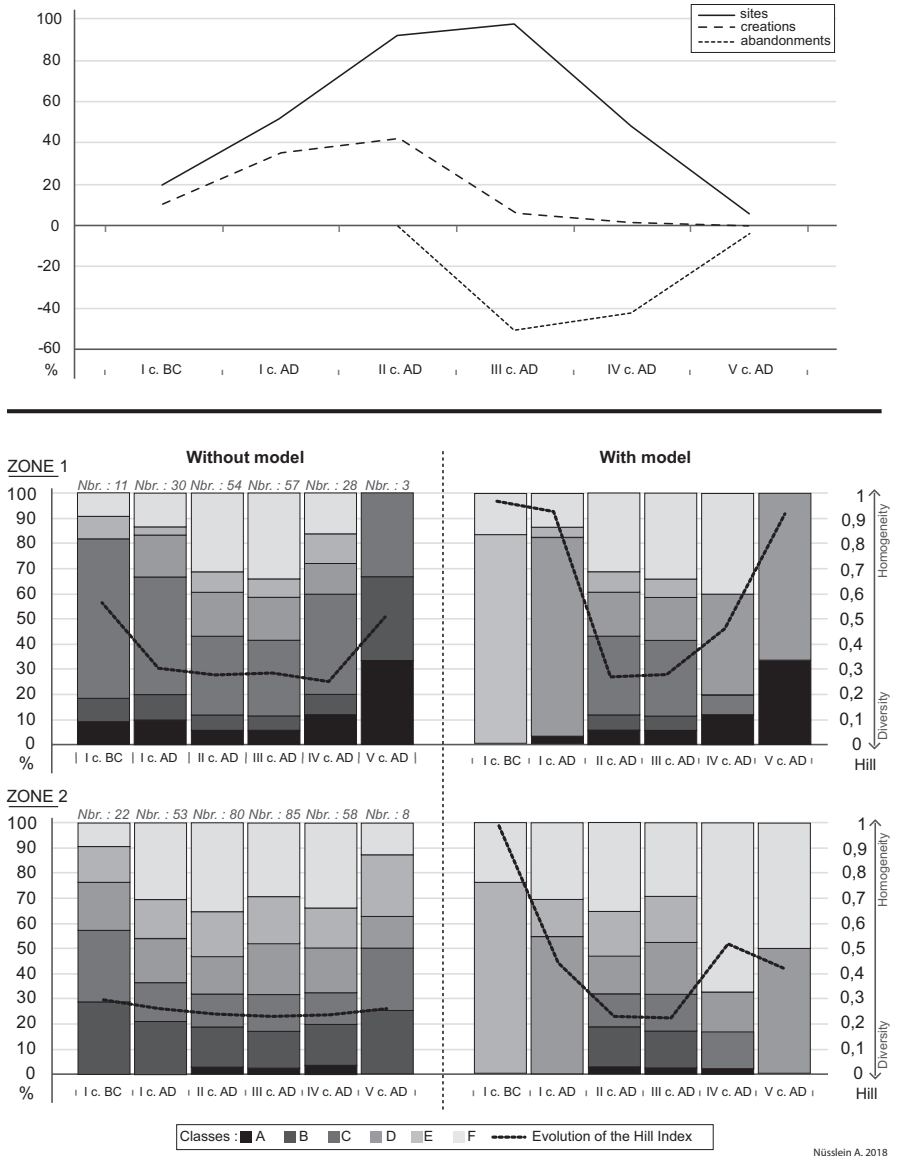


Fig. 5.4 Above: Relative evolution in the number of settlements, creation and discontinuations in the two micro-regions. Below: Relative evolution of the size of classes and evolution of Hill's index

century) (Fig. 5.4). Thus, quantitative data was confronted with qualitative data. Two observations are in order. First, when looking at the chronology of the excavated settlements, there are slight offsets within the curves. They are obviously due to the difference in chronological resolution between these two types of information, but not only. For example, the excavated settlements almost all still exist in the fourth century, whereas the curve of the number of sites discovered during surveys drops at that time. This is probably due to the characteristics of the settlements dating from this century because few visible traces were discovered in the surveys (because of wooden constructions, fewer ceramics, etc.). It is, then, necessary to qualify this collapse of the number of settlements during the fourth century. Secondly, we can see that the quantitative dynamics of the number of settlements is similar to the qualitative evolution of the settlements in term of development, stability and decline by comparing what is happening within the sites themselves and with the profile of the curves made from the results of surveys. When the settlement network becomes denser in the first and second centuries, the excavated sites are developing: they are getting bigger and better equipped, for some even with elements of comfort (hypocaust, bath, etc.). At the peak and at the end of the wave of creation, the excavated settlements stabilize. During the third century, when the curves are reversed, the settlements progressively collapse: their area decreases and they become, over time, mostly small sites.

Following this first analysis step, the model is then applied to the field surveyed settlements. Thus, if the sites discovered during field surveys display their 'optimal' state (peak) and if these settlements follow the same trajectory as the excavated sites, we can reconstruct, with all due prudence, their typological evolution. A settlement classified in group B during the creation of the typology is therefore given the status E during the first century BCE, D in the first century CE, B in second and third century CE and finally C in fourth century CE. Once the model is applied to all settlements discovered during field surveys, the static vision is modified: it is now changing. This allows us to visualize settlement pattern dynamics in a different way.

In order to demonstrate this, we compared the evolution of the composition of the settlement pattern with and without the application of the model (Fig. 5.4). On the left of the figure, without the use of the model, the composition of the settlement pattern is often the same over the centuries. This approach does not allow us to understand its dynamics since we do not understand the actual evolution. On the right, with the use of the model, appears a complete different image. In particular, we can note that the settlement shows another aspect in the two centuries that mark the beginning and the end of the studied period. In order to better understand the changes, we decided to measure and quantify the diversity of the settlements.

To this end, we applied an index used in ecology and which, to our knowledge, has never been used in archaeology: Hill's index. It is usually applied to measure the variety of species observed in an environment (Hill 1973). It is calculated from the Shannon index and the Simpson index, which make it possible to analyse the specific diversity of an environment by integrating the changes in the numbers of the rarest species, for the first one, and the most abundant for the latter. By combining

these two indices, the Hill index, applied to our field of study, thus provides a synthetic value revealing the diversity of a stand by taking into account both the number of categories of settlements and the distribution of individuals within the classes. The Hill index is expressed as: $(1/\lambda)/eH'$, where $1/\lambda$ corresponds to the inverse of the Simpson index and eH' to the exponential of the Shannon index. The closer the result of the calculation is to 0, the higher the diversity, and the closer it gets to 1, the more homogeneous is the settlement system. With the application of the model and the use of Hill's index, we can see that in the first century BCE, the settlement in the two micro-regions was little developed and only small farms existed. In the first century CE, with the development of farms, the first small villae appear and settlement begins to diversify as shown by the evolution of Hill's index. In the second and third centuries, the settlement system is more diversified. We can even see a society with a pyramidal structure. In the fourth century, because of the abandonment of many settlements and the loss of the status of certain sites (e.g. large villae become small settlements), the settlement system becomes more homogeneous again.

From this analysis, we can thus see that the transition between the La Tène period and the Roman period generated a strong diversification of the settlement system in which certain sites become very important. At the end of the Roman period, with the decline of sites, the settlement system became more homogeneous. As can be seen, the application of the model, in addition to Hill's index, therefore makes it possible to better visualize phenomena of diversification or homogenization of the regional settlement structure.

5.4.2 Structuring and Spatial Evolution of the Settlement Pattern

In parallel, the model also allows to understand the spatial dynamics in another way. For the evolution of the settlement systems of zones 1 and 2, it is clear that in the first century CE, the settlement is morphologically different with the application of the model: the areas seem less layered, and the poles of the networks (the principal sites) do not yet seem to have this status. The area is thus relatively homogeneous. In the second and third centuries, the settlement pattern is more layered with the presence of several small local networks represented by villae and small farms. In the fourth century, new scenarios can be drawn. With the application of the model, the main settlements of the previous phase no longer have the same hierarchical importance and the shape of the networks changes radically. The areas now seem less structured.

Thanks to the model, we can see that the main sites do not have the same role throughout the Roman period and their effect on the area may thus vary significantly. For example, a class C villa is at the head of a small network only in the second and third centuries. In reality, we see that the spatial configuration, just like

the internal trajectory of the sites, follows a bell-shaped evolution. It becomes layered and progressively more complex at the beginning of the Roman period and then becomes more homogeneous and less structured again during Late Antiquity.

Thus, with the application of this model, spatial analysis and the perception of settlement networks are no longer based on fixed data—settlements without phasing—but on dynamic information, settlements with (hypothetical) phases. They can thus provide results that are a little closer to the evolutionary reality of the settlement pattern. In this way, this approach makes it possible to reduce to a certain extent the uncertainties related to prospecting data and, above all, to propose improvements in the modelling of spatial dynamics.

5.5 Conclusion

Using field survey data for the study of regional settlement dynamics can have limitations because of the difficulty of precisely dating the evolutionary phases of sites. However, when excavation data are available in a study region, solutions can be considered to break down the static information provided by surface surveys into more dynamic chronological attributions of site development.

The study of the hierarchical trajectory of the sites and the comparison between the quantitative curves and the qualitative information resulting from excavations allow us to improve the understanding of the evolution of the settlement. In addition, the construction of an evolution model makes it possible to attribute hypothetical trajectories to the settlements discovered in surveys: this helps us to refine our perception of the temporal and spatial dynamics of the settlement system. In addition, Hill's index is a useful tool that allows us to follow the processes of homogenization or heterogeneity of the settlement pattern and thus to show the changes from a different angle.

From a methodological point of view, it is also important to note that the different analyses presented here show that, starting from a typology established on the basis of archaeological field surveys data, it is possible, with the addition of excavation data, to create models of evolution and to generalize information. In the end, the field survey data constitute a solid documentation base for the creation and the use of complex tools. However, the established model has a low value in terms of its representativeness: the number of settlements that were used to develop it is not very large. It is therefore advisable to remain cautious in its use and not to take this model as a finished piece of work but as an exploratory tool—destined to be refined—representing the main features of the typological evolution of the settlements.

It is hoped that this paper has shown the importance of using excavated data, when available, in studies based mainly on information collected in field surveys. Excavation data can provide many elements for a better understanding of settlement systems. They should not only serve to illustrate the results of the analyses, but especially be used in connection with field survey data.

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